

# Endoscopic Cannulation of the Ampulla of Vater:

## A Preliminary Report

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IN SPITE of the rapid progress which has been made in the non-operative visualization of almost every organ of the body by the injection of radio-opaque materials, radio-isotope scanning or arteriography, no consistently dependable method of pancreatic opacification has, as yet, been discovered. This failure is particularly significant because of the notoriously poor results of surgical treatment of malignant lesions of the pancreas, and the extreme importance of early detection of cancer in this deep seated organ.

Frustration in this field does not in any way reflect upon the urgent efforts of many investigators to solve the problem, and partial success has been reported by a large number of authors. Indirect visualization has been described by Poppel.<sup>5</sup> Arteriographic demonstration of islet cell tumors has been reported by Bookstein and Oberman<sup>2</sup> and by Clemett and Park.<sup>3</sup> Rannigen and Saldino<sup>7</sup> recommended a combined selective contrast material injection of the celiac axis and the superior mesenteric artery to demonstrate vessels in pancreatic tumors, and Jacquement<sup>4</sup> recommended the infusion of local anesthetics through a nasogastric tube followed by the use of anticholinergic agents and the injection of barium into the duodenal loop to demon-

strate lesions of the ampulla of Vater and head of the pancreas.

Perhaps the most significant contribution to the problem has been made by Blau and Bender<sup>1</sup> who employed Se<sup>75</sup> Selenomethionine for selective uptake by the pancreas and isotope scanning. The chemical similarity of selenium and sulfur is so close that substitution of Se<sup>75</sup> for sulfur within the methionine molecule results in an analog that is incorporated into proteins which in turn can be detected in the pancreas by scanning. This ingenious method, however, like those described has been of only limited practical value in the diagnosis of pancreatic neoplasms.

It seemed to us that the most practical way to demonstrate abnormalities of the pancreas would be by the direct non-operative injection of a radio-opaque material into the ducts through the ampulla of Vater. The infusion of contrast media into the ampulla of Vater during operations upon the biliary tract was described by Doubilet and Mulholland in 1955. The first non-operative injection into the common bile duct and pancreatic duct was reported in 1965 by Rabinov and Simon.<sup>6</sup> These authors, employing a peroral tube containing a cannula directed fluoroscopically to the

usual location of the ampulla, were able to visualize the ducts twice in one patient.

With the rapid development of fiberoptic gastroscopes and duodenoscopes, it seemed to us that visualization of the ampulla of Vater and direct cannulation should be possible with the injection of contrast material into both the common duct and pancreatic ducts for radiographic visualization.

### Method

An Eder fiberoptic duodenoscope which is sufficiently long to be passed into the second portion of the duodenum was used (Fig. 1). It has a proximal light source, a movable tip controlled by the operator through a lever on the handle, and both a forward and side lens. A tract was installed into the back of the instrument for passage of a cannula, which could also be bent and controlled by the operator. The position on the back of the duodenoscope was soon found to be impractical, however, since the cannula became impinged too easily on the duodenal mucosa. Therefore a temporary tract for it was taped in position on the anterior aspect of the scope, allowing the cannula to be passed into the field of vision of the lateral lens and bent into the ampulla. An endotracheal type cuff balloon (Fig. 2) was placed on the anterior aspect of the scope, just proximal to the lens which when inflated by the operator brings the mucosa into focus.

Under intravenous Valium and Demerol analgesia and locally applied viscous Xylocaine, the duodenoscope is swallowed by the patient. Under direct vision through the forward lens, the pylorus is visualized and after intravenous injection of 10 mg. of Probanthine, the instrument is passed into the duodenum (Fig. 3). The balloon on the anterior aspect of the scope is then distended to free the lateral lens from the mucosa and bring the latter within the proper focal length. The ampulla of Vater

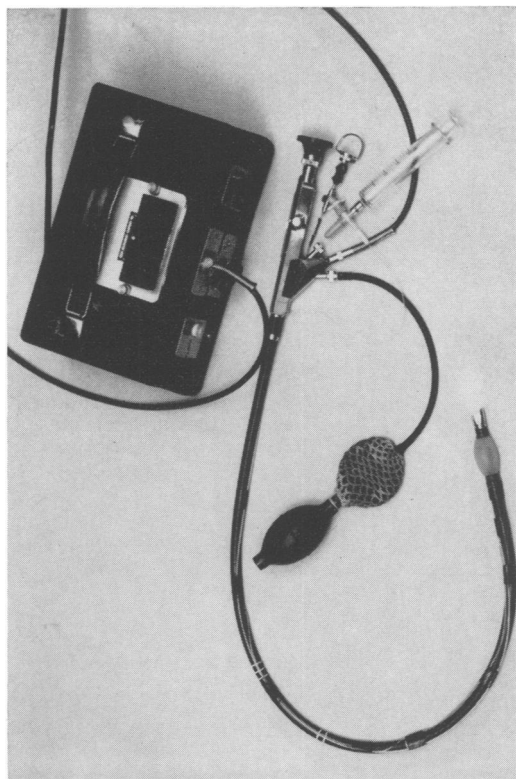


FIG. 1. Eder fiberduodenoscope fitted with channel for passage of cannula which can be controlled by operator.

is located. It appears as an elevated red spot on the duodenal mucosa which opens and closes, expelling bile and pancreatic juice. Any abnormalities are noted, and the cannula worked into it by manipulation. With the x-ray film in place, 5 cc. of 50 per cent Hypaque is injected slowly through the cannula, x-rays are taken, and both the cannula and duodenoscope removed. In many instances this procedure was carried out under general anesthesia during the course of other operative procedures, for the purpose of perfecting technic.

The technic is not easy and requires considerable experience. We have been able to pass the instrument into the duodenum in not more than 50 per cent of individuals examined. Furthermore, even with the

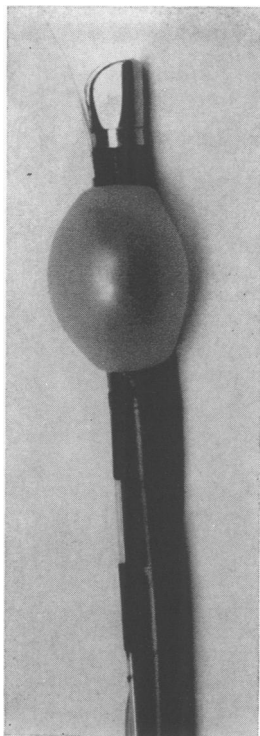


FIG. 2. Head of instrument with balloon inflated for bringing mucosa into focus, and cannula protruding in front of lateral lens.

fiberscope in the duodenum we have been able to cannulate the ampulla in only half of these patients. Thus, to date, we have been successful in only about 25 per cent of attempts. We feel, however, that with

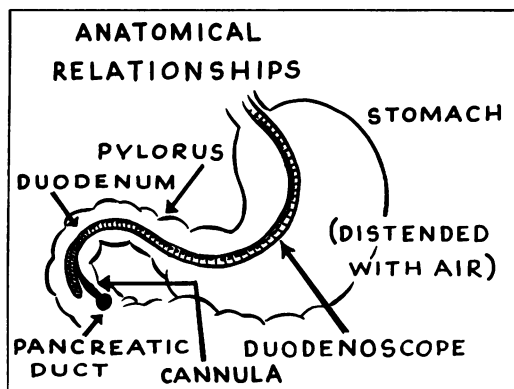


FIG. 3. Position of fiberscope in duodenum, with cannula extended towards ampulla of Vater.

further experience and improvement in the instrument, this percentage can be improved.

The danger of producing pancreatitis by the injection of Hypaque has been in our minds. We began by using 25 per cent Hypaque but found that the pancreatic visualization was too faint for practical value (Fig. 4), and therefore have increased the percentage to 40 per cent and 50 per cent without apparent harm (Fig. 5).

In approximately fifty patients there has been no morbidity resulting from this procedure. All patients on whom it has been carried out have been relatively normal individuals and therefore no pancreatic disease has been detected. Although this must be considered a preliminary report, we believe that with further experience this will prove a useful method of diagnosis, both of lesions of the ampulla of Vater and of the pancreas itself.

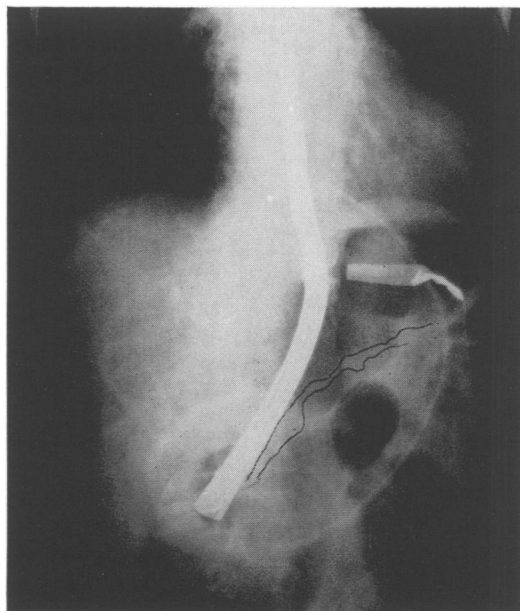


FIG. 4. Faint opacification of pancreatic duct using 25% Hypaque.

### Summary

A method has been described for endoscopic visualization of the ampulla of Vater and non-operative cannulation of the pancreatic duct. Using a fiberoptic Eder duodenoscope fitted with a controllable cannula, the ampulla of Vater is visualized, cannulated and injected with 50 per cent Hypaque solution for pancreatography. Although this is a preliminary report and success has been achieved in only approximately 25 per cent of cases to date, improvement in the results is anticipated with further experience and perfection of the instrument.

### References

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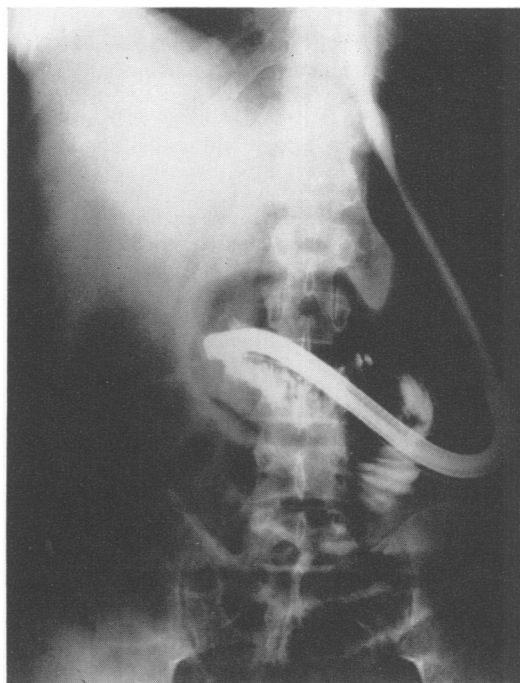


FIG. 5. Opacification of head of pancreas with 50% Hypaque in a patient with a cholecyst-duodenal fistula. The head of the pancreas is visualized, surrounded by the air-filled duodenal loop. Excess contrast material is seen passing down into the third and fourth parts of the duodenum.

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### DISCUSSION

DR. MONFORD D. CUSTER, JR. (Winchester): I do not wish to upstage Dr. McCune and his very splendid presentation, but I have had a little experience with endoscopy of the bile ducts myself, and, since some of you know about it already, I would like to recite it very briefly.

In 1959 I conceived the notion that there might be a better way to evaluate the duct system—the extrahepatic duct system—than by means currently employed, which included operating-room cholangiography. I was suddenly inspired with the idea that the means of doing this could

conceivably be by inserting into the common bile duct and into the hepatic bile ducts a properly designed endoscope. I became quite enthused and was puzzled that no one had thought of this before.

I blush to think of this, but I directed a letter to a prominent manufacturer of surgical telescopes, explaining that I had conceived this earth-shaking idea, and that both they and I were about to become world famous. I received a very prompt and polite reply, very much to the point, the point being that this was not exactly the first time that this technic had been suggested; and that, furthermore, if I would refer to a certain page of their catalogue, I would find their version of the chol-